

BIOFERTILIZERS FOR INCREASED LEGUME PRODUCTION (BGD/5/017) D1 New

CORE FINANCING

YEAR	Experts		Equipment	Fellowships		Scientific Visits		Training	Sub-contracts	Misc. Comp.	Total US \$
	m/d	US \$	US \$	m/d	US \$	m/d	US \$	US \$	US \$	US \$	
1995	1/ 0	11,400	35,000	3/ 0	9,900	-	-	-	18,000	-	74,300
1996	1/ 0	12,000	35,000	3/ 0	10,350	-	-	-	-	-	57,350
1997	-	-	20,000	-	-	-	-	-	-	-	20,000

First Year Approved: 95

OBJECTIVES: To assist in establishing technology for large scale production of biofertilizers (Rhizobium inoculum) in order to increase and sustain production of pulses.

BACKGROUND: Pulses such as lentil, chickpea and groundnut are a popular and important source of food in Bangladesh. In 1990 the production of these crops, 280,000 tonnes, could not meet the national demand and 70,000 tonnes were imported at a cost of about \$25 million. The use of biofertilizers to increase food production has both economic and environmental advantages, and considerable local experience in biological nitrogen fixation (BNF) studies is available. Two projects, on nitrogen fixation in grain legumes and on nuclear techniques in agriculture (BGD/5/012 and BGD/5/013) were initiated in 1985 and 1988 respectively, implemented at the Bangladesh Institute of Nuclear Agriculture (BINA), Mymensingh. BINA received expert services in soil microbiology in addition to some equipment for rhizobiology work and biofertilizer techniques. Field studies under this project have identified elite genotypes of grain legumes which, in combination with appropriate strains of Rhizobia, can fix larger amounts of nitrogen than the traditionally used local cultivars. More importantly, it has been possible to increase the yields of lentil, chickpea and groundnut by 30-40%. What is now required is the introduction of biofertilizer technology on a pilot scale as a prelude to large scale production and to develop logistics for nationwide distribution and use by farmers. Even a modest average yield increase of 20% could bring an increase in production of 56,000 tonnes, which could not only offset the demand deficit but leave a substantial excess for local consumption or export. In Bangladesh, lentil, chickpea and groundnut cover 357,000 hectares (out of an area of 730,000 hectares used for all pulses). The present national requirements for biofertilizer is about 750 tonnes per year. Studies conducted at BINA using nitrogen-15 have shown that the use of biofertilizer containing appropriate strains of Rhizobium bacteria for lentils, chickpea and groundnut can contribute 70-100 kg per hectare of atmospheric nitrogen through biological fixation. The savings using biofertilizer (\$3-\$4 per hectare) would be equivalent to approximately 150-200 kg urea per hectare (\$20-\$25 per hectare). The harmful effects on the environment of using commercial nitrogen fertilizer would also be reduced. The project is expected to generate its own funding through a contract mechanism with a private company to sustain future activities.

PROJECT PLAN: The immediate goal is to establish a demonstration plant for the production of biofertilizers at BINA and to undertake a national demonstration campaign. The Agricultural Extension Department of the Ministry of Agriculture, in collaboration with BINA, will conduct demonstration trials on 4000 fields of 400 square metres each in the first year and a similar number in the second year in order to demonstrate to a large number of farmers the effectiveness of biofertilizer. Subsequently, it is planned that a local company will embark on a commercial scale production plant as a second phase of the programme, which is expected to start in 1997.

NATIONAL COMMITMENT: BINA, in Mymensingh, owing to its excellent infrastructure, is the most appropriate institution to implement the project. However, adequate building/laboratory space and manpower would be required to accommodate the production plant(s) and provide packaging and storage facilities. A reputable industrial firm has signed an agreement with BINA to set up a manufacturing plant for production of biofertilizer with technical and scientific support from BINA. BINA and the Agricultural Extension Department, with the help of the Agency, will conduct demonstration trials in 8000 fields during two years. Biofertilizer production was the first of the seven biotechnologies listed in a report prepared at the request of the Prime Minister's Office.

AGENCY INPUT: Expert services on production of high quality biofertilizers; equipment and supplies, mainly inoculum fermentors, and N-15 labelled fertilizer for field testing superior cultivars of legumes and biofertilizer strains; support to partially cover the demonstration trials on farmers' fields in collaboration with the Agricultural Extension Department; fellowship training.

IMPACT: Increased annual production of lentil, chickpea and groundnut would increase the income of farmers, who are the end users. Thus, the annual returns and the long term impact of increased legume production and food security from a modest Agency input would be substantial. Improved technological and R&D capabilities in biofertilizer production at BINA would have a short as well as long term impact on the sustainability and further development of the technology in Bangladesh.